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But mere treatment of infected trees is not enough. The healthy trees lying side by side, or trees exposed to infection, should also be sprayed as a preventive measure. The proposed plant protection programme should cover the whole State in progressive stages by the end of the Fourth Plan. This would cost about Rs. 5 crores during the next 10 years, but a part of this may be recovered from the farmers as spraying charges.

2.90 Coconut is mostly grown as an unirrigated crop. During the summer months they are drought-affected in many parts of the State and drought has a telling effect on the trees. It is found that under irrigated conditions, the trees regularly give higher yields and there is very little premature shedding of buttons. It is, therefore, suggested that the Department of Agriculture should start popularizing irrigation of coconut gardens. Filter point tube-wells and pumping sets would be suitable as means of irrigation and the State should arrange for loans on easy terms for their installation.

2.91 The average economic life of a coconut tree is about 60 years. It is estimated that over 50 per cent of the trees in the State are over 50 years old and, therefore, in about 10 years, these trees would be past their economic life. Unless immediate steps are taken to replace the aged trees, the production of nuts after a few years is bound to decline in spite of all the measures suggested so far. A campaign should, therefore, be launched to replace old trees by fresh plantings.

2.92 There is not much scope for extending the area under coconut since most of the suitable area has already been brought under the crop. This is particularly so in the former Travancore-Cochin area. However, there is some possibility of raising new coconut plantations in the interior strip of Malabar along the foot of the western ghats. The Indian Central Coconut Committee estimates this area to be of the order of 100,000 acres. It is suggested that Government should make all efforts to bring this area under coconut cultivation. There are some difficulties in the way of bringing about the extension of area, for example, lack of adequate funds with the small farmers, and their preference for rubber plantations because they do not fall within the purview of the Land Ceiling Bill, etc. Some of these hurdles could be overcome if the State offers long term loans to intending farmers for the purpose of raising fresh plantations. Assuming that loans at the rate of Rs. 1,000 per acre are distributed, the total loan fund required to plant 100,000 acres during the next decade would be around Rs. 10 crores.

2.93. Production of quality seedlings from approved stock in large numbers is also necessary for the programme of under-planting and raising new plantations. The State nurseries, at present, have a capacity of 2.2 lakh seedlings a year. This capacity would not be enough to meet the future needs. It is suggested that the nursery capacity should be doubled during the Third Plan by starting 15 new Government nurseries. This would require an outlay of about Rs. 600,000 during the next two Plans. However, as even these would not be able to meet the anticipated demand, private nurseries may also be encouraged to produce quality seedlings in the different regions of Kerala. As a result of the improvements suggested above, the output of coconuts may be expected to double by 1970-71.

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2.148 Manuring of arecanut gardens is grossly inadequate in Kerala. It is found that when the gardens are adequately manured and intercultured, the yields are high and there is much less of premature shedding. A combination of chemical (NPK) and organic manures has been found to give the best results. However, since arecanut is a tree crop like coconut, the benefit of manuring would accrue only from the third year of application of fertilizers. Most of the farmers are reluctant to wait for such a long time. Only cheap long term loans for manuring could bring a favourable change in attitude. In addition, as in the case of coconuts, a systematic replanting programme is also desirable.

2.149 Knowledge regarding the scope for extension of area under arecanut is too meagre to hazard any accurate estimate of possible future planting. However, there is a feeling that the area can be increased by at least 50 per cent, most of which will be in the Malabar region. But irrigation facilities are a pre-requisite for any fresh planting. It is suggested that 25,000 acres of new areca plantations may be raised during the next 10 years. The investment required up to the bearing stage is about Rs. 1,500 per acre. Total investment on 25,000 acres of new plantation would, therefore, be Rs. 3.75 crores.

2.150 Care should, however, be taken to see that all new plantings are done with improved seedlings. In order to meet the increased seedling requirements, it is proposed that five more State nurseries, apart from the present five, should be started during the first half of the Third Plan. This would need an additional investment of about Rs. 125,000. The strength of private nurseries could also be increased from the present level of 120 to 300 by the end of the Third Plan. Development programme for arecanut can, however, succeed only if it is backed by an efficient plant protection drive since diseases and pests are very common in arecanut gardens.

CONCLUSIONS

2.151 The plantation sector, as a whole, faces a multitude of problems in Kerala. Some of them are specific for particular crops such as devastating diseases in the case of coconut, arecanut and pepper. But many of the problems arising on account of inadequate replantation and under-plantation, low yield rates, lack of funds with growers for replantation and new plantations, inadequate supplies of inputs especially of fertilizers, wide fluctuations in prices and export markets are common to all crops. The State and Central Governments as well as the respective commodity committees or Boards are earnestly taking appropriate measures to solve many of these difficulties. Measures such as the provision of technical guidance, long term and short term loans at easy terms for replanting and manuring, export promotion, market research, compulsory gardening, and supply of improved varieties of planting material, etc., have been in operation for quite some years. The effect of these efforts, however, has not been very significant owing to inadequate size of the programme. This is particularly so with regard to loans for planting, subsidies and fertilizer allocations. The State should help in procurement of the necessary credit facilities and fertilizers, especially those containing nitrogen. It is suggested that at least a minimum of 350,000 tons

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But much of this increase is the consequence of a greater diversification in agricultural activities with a view to reducing unemployment and under-employment among family labour and raising the family income. Poultry-keeping has, of late, become very popular with the rural families and it is unusual to find families in the rural areas which do not rear at least a few laying birds. Kerala produced 137 million eggs (hen eggs—114 million; duck eggs—23 million) in 1951, and ranked fifth among the States in egg production. Production of eggs is now much higher and may be around 200 million. Kerala is also the biggest exporter of eggs. These are sent as far as Punjab in the north, Calcutta in the east and Bombay in the west and even to foreign countries, mainly Ceylon.

Low Productivity of Livestock

3.5 On an average a cow yields 330 lbs. of milk per year, a buffalo 619 lbs. and a goat 40 lbs. These yield rates compare very unfavourably with those for other parts of India (Table 16).* The low productivity of animals is partly due to the poor inherent breed characteristics and partly due to the conditions under which they are reared. The cattle found in Kerala are all of a non-descript type. They are small in size and build. They are stunted in growth. Buffalo in Kerala weighs about half of its counterpart in U.P. or Punjab. The same is true of other livestock too.

3.6 The livestock, especially the bovines, are reared under unwholesome conditions. They are under-fed. The bulk of the ration consists of roughages, mostly rice straw, and is grossly deficient in proteins and other protective properties. The livestock feed available in Kerala is also highly deficient in some of the important bone-building minerals such as calcium and phosphates. This is a direct consequence of a high rainfall which has leached off most of these minerals from the root zones of soils. In the absence of adequate phosphatic and calcium soil amendments, the crops grown in such soils are poor in these minerals. Lack of minerals has a telling effect on the health, build and general condition of the livestock of Kerala. The small size and build are important causes responsible for their low milk yield and poor work output.

3.7 Nutritional deficiencies lead to a number of serious consequences. Poor health results in low vitality and resistance to diseases as well as a low rate of nutritional utilization from feeds. All these factors are responsible for a low level of efficiency and other hazards such as a high rate of mortality and a low rate of fertility. However, realizing the reasons for low productivity, many enlightened farmers have taken to scientific rearing of livestock and have started adding concentrates, such as waste grains, oil cakes and mineral mixtures to the cattle feed. Credit for this goes to the State's Animal Husbandry Department which has been making special efforts to educate the peasantry on the need for adding mineral mixtures to the livestock feed. The Department has been distributing mineral mixtures to farmers at subsidized rates in order to popularize them.

3.8 In view of the very poor quality of livestock in the State there is an urgent need for developing animal husbandry in Kerala. Although animal husbandry

* Table 16, appearing on p. 282 of the text, has not been processed -- Analyst

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programmes do not create any significant increase in direct employment opportunities, they do help in reducing the degree of unemployment situation within the family. Moreover, some of the animal husbandry activities such as piggery, poultry-rearing, and bee-keeping need little investment to start with and are quick to yield returns.

3.9 Development of animal husbandry on commercial lines by individual rural families may not be possible without adequate State action. Aid should be given for implementing measures of improvement with a view to increasing the efficiency and productivity of the livestock. The aid could be given int he form of easy loans, development of marketing and processing facilities, sale of feed and fodder at reasonable prices, etc. These are discussed in the subsequent paragraphs separately for cattle and other livestock.

CATTLE DEVELOPMENT

3.10 The output of milk from cattle and buffaloes as well as draught capacity can be improved through a scientific breeding programme and the prevention and control of diseases. As stated previously, cattle found in the State are of non-descript types. Unless they are imparted with high productivity genes, any amount of improvement in feeding and rearing will not be of much use beyond a particular stage. It is, therefore, necessary to concentrate on improving the breed of cattle and buffaloes. There are two ways of tackling this problem: (*i*) selective breeding and (*ii*) mass upgrading.

3.11 The former is not feasible, as there may not be enough cattle to start with if rigid norms are employed for selection. There will also be the problem of finding suitable means of disposal of the useless cattle. The practical solution under these circumstances would be to resort to a scheme of mass upgrading according to which the local bulls are to be replaced with bulls of some outside breed, suited to local needs and conditions. To be really effective, the upgrading programme should be made to cover the entire State and should stretch over a span of at least four decades. During this period, no bulls, other than the approved ones, should be allowed to sire.

3.12 The value of the upgrading programme was realized in Kerala a few decades ago. The scheme was introduced on a large scale during the First Plan by starting five Key Village Schemes. The number was raised to 14 in the Second Plan. It is estimated that by 1965-66, it would be possible to cover about a quarter of the eligible milch cattle under the Key Village and Artificial Insemination Schemes. But even though the programme is well conceived and implemented, the NCAER team was left with the impression that the scheme had not made any significant impact in the improvement of cattle and buffalo breeds in the State. Apart from the inadequate coverage of the programme, non-elimination of the local or scrub bulls is a serious problem. For success and effectiveness of the upgrading programme, it is, therefore, necessary, first, to implement the programme intensively all over the State and secondly, competition from the local bulls should also be eliminated by compulsorily castrating all the males before they reach the fourth year of their life. These suggestions may be implemented during the Third Plan.

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INVESTMENT ESTIMATES

3.36 It is not possible to give the exact extent of investment that would be needed to implement the measures suggested here as the major part of investment would be in the nature of improvement in the rearing conditions, erection of broods, purchase of livestock, poultry, etc., which have to be undertaken by individual farmers themselves. The public sector component of total investment for the programmes suggested in the above pages comes to Rs. 2.7 crores. The major schemes for improvement of cattle, etc., and the likely public sector investment on these is given below:

	Rs. lakhs
Breeding programme	6.76
Veterinary aid	77.30
Poultry Extension Centres	35.75
Dairies (milk-processing units)	145.00
Egg powder factory	3.00
TOTAL	267.81

3.37 Assuming roughly that the proportion between private and public sector investment in the sphere of animal husbandry is the same as in the agricultural sector, private investment by farmers for improvement of livestock and poultry may be taken to be Rs. 3.5 crores. On this basis total investment, therefore, would add up to Rs. 6 crores during the coming decade.

3.38 As a result of the above schemes, it is estimated that milk production will go up by approximately 50 per cent while egg production may even double its present level. Output of milk may, therefore, be expected to be 2·73 lakh tons and that of eggs 400 million by 1970-71. NCAER's population projections estimate the population of Kerala in 1970-71 to be 20.12 million. Consumption of milk by the end of the Fourth Plan is, therefore, likely to be about 2 ozs. per head, if the above measures are effectively implemented.

[Text continues on p 67]

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313 be so regulated as not to disturb the present symbiosis between the plant species present. Intensive research is, therefore, urgently required to find ways and means [654] of inducing adequate regeneration of the evergreen forests. There are at present two research stations in the State at Malayathur and Nilambur. The location of a third station in the evergreen forest areas is recommended.

Eupatorium

137 4.25 A problem that has been engaging the attention of the Forest Department is that of the weed eupatorium. It got introduced into the State from Assam at the end of the Second World War by some ex-service men who had served in Assam. The weed has spread like wild fire throughout the State and has become a serious [654] menace. Recent research carried out by a biochemist in Trivandrum has found a use for this shrub in the manufacture of fertilizers. Further research may be carried out to find its fruitful uses.

Tribals

*433 4.26 A few tribes reside within the forest areas. They are allowed free grazing 162 rights and privileges of cultivation, free of assessment. However, this does not provide 46 them with a full-time occupation. On the other hand, it is not possible to arrange for their migration to midland or the coastal region because of the high pressure of [245] population which exists in these areas. It has, therefore, been suggested in this Report, that two labour colonies should be formed in grass land *sholas* where large scale planting of *Eucalyptus Grandis* is taking place. This labour force could later be employed in the proposed newsprint mills when they come up.

RECENT DEVELOPMENTS

*433 4.27 During the First Plan period there was no forest development scheme. A 313 beginning in forest development programmes was made only during the Second Plan. 654 An amount of Rs. 1.24 crores out of a total Plan outlay of Rs. 87 crores was earmarked for forest development plans in the Second Plan period. By the end of 1959, however, only Rs. 21.68 lakhs had been spent. The shortfall arose mainly on account of two items. The largest single item among forestry was acquisition of private forests in Malabar and for this Rs. 40.95 lakhs had been allotted. Due to procedural difficulties, this could not be undertaken and only Rs. 0.34 lakhs had been spent by the end of 1959. Secondly, although the progress of cashewnut afforestation programmes in terms of physical target has been statisfactory, as can be seen from Table 24, the cost of afforestation programmes at Rs. 24 lakhs was an over-estimate. Actual performance has been possible within Rs. 4.81 lakhs.

4.28 Table 24 gives the Plan provision and progress in execution of various schemes upto the end of 1959. Overall progress has been slow, except in the raising of plantations where the Department hopes to achieve all the targets. The slow progress

2 [Table 24, appearing on p. 287 of the text, has not been processed - Analyst]

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in the early years has been due to the fact that either the sanctions from the Government were received late or the staff was not appointed in time. The shortfall in performance during the Second Plan period emphasises the need for devoting greater attention to forest development programmes during the Third Plan period.

FUTURE DEVELOPMENT OF FORESTRY

4.29 Forests are an important source of raw material for industry in Kerala. Their importance is brought out by the fact that forest-based industries are more predominant in the economy of Kerala compared to the position they occupy in the industrial structure of India as a whole.[1]

4.30 In view of the important position occupied by the forest-based industries in Kerala, the policy towards forest resources should aim at long-run enhancement of the forest potential so that an increasing surplus of raw materials could be made available to industry. Forest development policy in the State should, therefore, be guided by the following objectives :

(*i*) Utilization of resources as yet untapped.
(*ii*) Raising the long-run forest potential through:
  (*a*) acceleration of the process of conversion of poor deciduous forests into valuable teak and softwood plantations.
  (*b*) extensive reclamation of grasslands on the basis of experimental Eucalyptus plantings carried out during the Second Plan.
(*iii*) Incorporation of technical improvements in the methods of logging, etc., so that wastage could be reduced. These aspects are discussed in the following paragraphs.

Existing Potential

4.31 In Kerala, the existing potential of forest resources is being exploited comparatively much better than in many other States of India. Due to easy accessibility provided by the numerous rivers and roads, many of which serve the forests, extraction has been very much facilitated. The importance of the role of river transport in exploitation of forest wealth is shown by the fact that two big centres of forest produce, viz., Kallai and Chalakudy are both located by the side of rivers. Although the general picture as regards exploitation of existing resources is quite bright, some pockets still remain untapped. These are discussed below :

4.32 (*i*) *Bamboo Resources* : In spite of a large bamboo potential in the State, this source remains completely unutilized for industrial purposes. Out of the total available supply, about two-thirds is utilized for local requirements of construction, etc. The position regarding the quantum of surplus available is as follows.

[1] See Chapter on Industries.

5.5 The average annual landing of marine (coastal) fish is estimated at 260,000 tons (35% of the all-India output) and the gross value of marine catches at Rs. 6.5 crores.

5.6 The catches from coastal waters comprise such commercially important species of fish as Sardines (20%), Prawns (13%), Mackerel (11%), Sharks (5%), Silverbellies (4%), Horse Mackerel (4%), Sole (3%) and Ribbon fish (3%). According to a sample survey conducted by the ICAR in Travancore-Cochin area, about 61 per cent of the total landings are consumed in fresh condition and the remaining part is utilized in various fish-based industries. (An alternative estimate by the State Fisheries Department puts the ratio as fifty-fifty.)

5.7 Dug-out, plank-built canoes and catamarans are the main types of crafts employed for fishing. Dug-out canoes are more popular throughout the State. Boat seines, gill nets, lines and hooks, coast nets and shore seines are the important tackle used in Kerala. Drift nets are used for catching Sardines, Mackerels and Sharks while long lines are sometimes employed for exploiting Horse Mackerels and Shark fisheries.

5.8 During the last decade efforts have been made to introduce mechanized fishing in order to raise the outturn and improve per capita income of the fishermen. Experiments for mechanizing indigenous boats and introducing suitable new types of mechanized crafts have been carried out in the State with the help of FAO experts and the Indo-Norwegian Project. However, unlike Maharashtra, Kerala has made very little progresss in mechanizing its fishing activity. This is mainly explained by the fact that the indigenous crafts in use in Kerala at present, have been found unsuitable for the installation of engines. Thus, to introduce mechanized boats, new boats have to be designed and constructed. As a result of a number of investigations and trials, a few small mechanized boats, ranging from 20 to 26 feet in length, have been recently introduced in the State. The Indo-Norwegian Project has so far issued 88 mechanized boats to the fishermen who completed training with the project. In addition to these, the State Fisheries Department has also issued 39 mechanized vessels. Of these, 25 have been issued to fishermen; of the rest, some are operated by the Department at training centres for transportation of fish and some still remain idle.

5.9 In Kerala, as in some other marine States of India, mechanized boats are issued at subsidized rates to fishermen's cooperatives, groups of fishermen and to trainees who have been trained at one of the two Training Centres in the State. The quantum of subsidies is in line with the all-India pattern, that is, 50 per cent of the cost of engine, 25 per cent of the cost of hull and 33⅓ per cent on that of fishing nets and gears.[1]

5.10 The Indo-Norwegian Project is playing an important role in the development of fisheries in Kerala. The project aims at the improvement of socio-economic conditions of the fishermen. The programme envisages an increase in the production of fish as well as the earnings of the fishermen, improved handling and distribution of catches, the promotion of cooperative activities, and better sanitation and living conditions in the fishermen's villages. The project has also undertaken the supply of fish to the interior areas of the State. It provides most of the basic requirements of

[1] The Indo-Norwegian Project issued nets and gear on 80 per cent and hull and engine on 50 per cent subsidy in the beginning.

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the fishing industry, owns a boat-building yard, a workshop, a cold storage and refrigeration plant and runs a training centre. The fishing villages are thus being developed into what may be called Integrated Fishing Centres.

5.11 *Off-shore Fishing*: An attempt to introduce exploratory and commercial off-shore fishing operations from Cochin port was made by the Travancore-Cochin Government as early as in 1940. A Government sponsored private company operated three large-sized (65 feet to 90 feet) vessels for a time. But these operations proved abortive and were given up owing to lack of trained crew and absence of docking and repairing facilities. Thorough exploratory investigations have been on for the last few years, and at present deep-sea fishing is being carried on jointly by the Government of India and the Indo-Norwegian Project.

5.12 *Chank Fisheries*: With the transfer of some areas of Travancore-Cochin to Madras at the time of the reorganization of States, Kerala has lost some of its important chank fishing centres along the Kanyakumari coast, and only a few centres of lesser importance, Thekkay Kollencode, Poovar, Pulinkudi, Poonthura, Shankumugham and Veri are now left with the State. The right of collection of chanks is annually auctioned on royalty basis, preference being given to cooperatives. The number of chanks collected and the money realized by the cooperatives in 1957-58 and 1958-59 were 26,629 chanks (for Rs. 16,361) and 18,355 chanks (for Rs. 9,177.50) respectively.

Inland Fisheries

5.13 Estuaries, backwaters and adjacent low-lying fields, rivers and canals, ponds, tanks and reservoirs comprise the inland fisheries of Kerala. According to the State Fisheries Department, the total production from these sources is at present about 50,000 tons per annum. This represents only 20 per cent of the total fish production in the State. The inland fish production of Kerala, though much lower than that of West Bengal (12,000 tons), compares favourably with that of Madras (40,000 tons).

Estuaries and Backwater Fisheries

5.14 The more important rivers opening directly into the sea and having permanent link with it are the Periyar, Bharatpuzha, Beypore, Billiapatam and Korapuzha. Regular fishing in the estuaries is done only during the south-west monsoon period (end of May to beginning of August) when fishing activities in the sea, owing to rough weather, are almost at a standstill. The estuarine catches include such varieties as Mullets, Milk Fish, Prawns of different types and Horse Mackerel.

5.15 The backwaters of Kerala covering approximately an area of about 300 square miles, are the most important source of inland fish production. The main areas are Ashtamudy, the Kayamkulam and the Vembanad, all situated in the Southern part of the State. The production from estuaries and backwaters is estimated by the State Fisheries Department at about 46,000 tons per annum. Prawns constitute the bulk of the catch which comprises, in addition to Prawns, Mullets, Bekti, Horse Mackerel and Engraulis.

11: India G-4, 5 (1960-1961) 1962 AW11 Kerala AW11

5.33 The introduction of about 1,600 mechanized boats during the next decade is not likely to subject Kerala's fishing grounds to undue pressure. A beginning may be made with 600 such boats during the Third Plan. The cost of a new mechanized boat (engine, fishing gear and equipment) would be about Rs. 29,000. It is desirable to continue with the present pattern of financial help to the fishermen for boats and gears in the form of loans and subsidies for some time to come.[1] A subsidized mechanized boat would cost about Rs. 19,000. This amount should be advanced to the fishermen by the Government as a long-term loan. On this basis, the total capital cost of putting 1,600 mechanized boats into operation during the next 10 years will be of the order of Rs. 4.64 crores (Rs. 1.76 crores as subsidy and Rs. 2.88 crores as loan). The consequential annual production is expected to be of the order of 30,000 tons by the end of the Third Plan, and 80,000 tons by the end of the Fourth Plan. The value of the additional production of 80,000 tons will be Rs. 2 crores.

5.34 These mechanized boats should be operated from a select number of Integrated Fisheries Development Centres, each centre being provided with such basic facilities for the fishing industry as the supply of oils and lubricants, refrigeration, processing, etc. The establishment of a number of such Integrated Centres should be the utilimate aim. The Indo-Norwegian Project has already developed an Integrated Centre at Neendakara. About 15 of these centres may be established during the next two Plans. Among other places, Quilon, Alleppey, Cochin, Azhikode, Ponnani, Beypore, Tellichery, Cannanore and Balliapatam would provide good sites for developing such centres.

5.35 The introduction of 1,600 mechanized boats will create employment opportunities directly for about 6,400 fishermen. In order to obviate the unemployment situation, the Government may undertake a programme of supplying about 6,000 indigenous boats which will create employment for about 22,000 fishermen by the end of the Fourth Plan. The average cost of an indigenous boat with the necessary gear would be Rs. 2,000 (Rs. 1,000 for the craft and an equivalent amount for the gear). A subsidy of 25 per cent on the cost of the boat and another 33⅓ per cent on the cost of gear may be given to the fishermen. The total capital cost on 6,000 boats would be about Rs. 1.2 crores. The additional catch from these indigenous boats is expected to be of the order of 60,000 tons per annum by the end of 1970-71, valued at Rs. 1.5 crores.

5.36 The existing boats can increase their catches considerably if they are provided with better fishing gear. At present there are about 22,000 indigenous crafts in the coastal waters of Kerala. Initially, at least a third of these boats should be supplied with better gear. The cost of such a programme would be about Rs. 85 lakhs. At the present rate of subsidy of 33⅓ per cent, the Government's share in this cost will be Rs. 28 lakhs. An additional production of 25,000 tons of fish valued at Rs. 62.5 lakhs may be expected by the end of the Fourth Plan.

5.37 Thus, the development of coastal fisheries would entail a total investment of about Rs. 7 crores, of which Rs. 3 crores would be required during the Third Plan. As a result of this investment, an additional annual production of 80,000 tons valued

[1] A subsidy of 50 per cent is given on the cost of engine, 25 per cent on that of hull, and 33⅓ per cent on that of gear and tackle.

will be essential to provide a properly trained and experienced Fisheries Development Officer in overall charge of each Integrated Centre for coordinating its activities.

Training

5.57 At present there are three centres to train fishermen in the State. The training course which extends over six months aims mainly at training the fishermen in the operation, servicing and maintenance of marine engines, making of nets and tackles, improved fishing methods and the fundamentals of navigation.

5.58 These centres are located at Neendakara, Ernakulam, and Beypore. The first two centres can train 20 fishermen each in a batch, and the last can train 15. So far, 272 fishermen have been trained at the Ernakulam and Beypore centres (run by the Fisheries Department), of whom 150 are now actually employed in mechanized fishing. At the Neendakara centre, which is run by the Indo-Norwegian Project, 121 fishermen have undergone training so far.

5.59 The programme suggested for the next 10 years would require a crew of about 6,400. This would involve a huge training programme and entail a heavy burden on the State. Arrangements can at best be made to provide training facilities to about half the number. The rest can receive on-the-job training from the trained fishermen. As about 1,200 trained fishermen would be required by the end of the Third Plan, not only will the capacity of the existing training centres have to be increased but also at least five new centres will have to be established.

5.60 The operation of the proposed medium-sized boats will also require the services of trained skipper-cum-master fisherman. Either a special centre for training skippers should be established in the State, or the facilities at the Government of India Deep-Sea Fishing Stations at Bombay and other places should be expanded. For operating trawlers, the State Government should enlist the collaboration of foreign fishing companies in order to obtain along with the fishing vessels, the services of trained technical personnel. At the same time efforts should also be made to train Indian personnel in the various fields by appointing them as understudies to the foreign technicians or by sending them abroad. The training of Fisheries Development Officers, Marketing Officers and other high level technical staff can be arranged at the Institute of Fisheries Education, which is proposed to be started by the Union Ministry of Food and Agriculture. For training the middle and lower level staff, it is desirable to establish a Fisheries Training Institute in the State.

INVESTMENT AND OUTPUT IMPLICATIONS

5.61 A substantial part of investment will be on mechanization of boat craft and acquisition of trawlers for off-shore fishing. These two items alone will absorb Rs. 6.35 crores out of a total investment of Rs. 10.72 crores.[1] Details of investment on various items are given in Table 27.[2] This does not include expenditure on deve-

[1] The outlay allocated for the Third Plan is Rs. 4.5 crores, which will leave a balance of Rs. 6.75 for the Fourth Plan, if suggestions made in this Report are to be implemented.

[2] [Table 27, appearing on p. 289 of the text, has not been processed — Author]

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433 654 228 lopment of fishing harbours, landing and berthing facilities, rail transport, training, welfare work, cooperatives, research, etc. A considerable part of the expenditure will be in the form of loan to fishermen recoverable in course of time.

5.62 As a result of this programme the additional production of fish by the end of the Fourth Plan can be expected to be of the order of 200,800 tons per annum, valued at Rs. 5.26 crores. These programmes for fishing development would create additional employment opportunities for about 33,000 persons in Kerala during the next decade. This figure, however, does not include employment opportunities which would be created by the development of culture fisheries, marketing, net-making, transportation, supervision and training.

31: Slater S-5 (1916-1917) 1918 AWI India
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351 useful for cookery are watered and grown in the compound itself; while during the rains also vegetables are grown, such as brinjals, lady's fingers, pumpkins, peas, etc. During summer the trees and vegetables in the compound are watered from the well which is a special feature of every house.

242 *Insect-pests.*—The *caterpillars* of certain moths ate away this year (1916) the tender blades of the paddy as soon as they cropped up from underground. This appeared at the beginning of the sowing season (May) and lasted for a week or two. Farmers here say that these have not appeared for years past. When I wrote to the Agricultural Superintendent of the State at Trichur he suggested the following remedy: "Dig a trench ½ foot wide by 1½ feet deep along the four sides of a field where these insects would fall in their travel from field to field, but would not be able to get out of it."

A kind of fly or flea is said to eat away the juice of the rice at the stalk of the paddy as soon as it reaches the milk stage.

232 *Cattle diseases.*—Sore feet. The feet are well washed with hot water, and turpentine, teak-oil, or cashewnut oil is smeared in the sore; the animal is also made to stand in a muddy place into which the leaves of a certain tree are strewn.

Mouth disease. Pig-ghee or bear-ghee is smeared on the tongue.

Swelling in the belly. The animal without any apparent cause falls down and dies. No medicine is applied in such cases.

Malignant sore-throat and cow-pox are also common.

●[654] An Agricultural Department for the State has been established recently at Trichur with a model farm attached to it. The present Superintendent is an England-returned Cochinite. Help is often derived from here, but the farmers themselves are shrewd in practical agriculture.

313 *Timber.*—Wood for fuel, implements, buildings, etc., is obtained from the neighbouring hills and forests. The taluk of Talapilli is full of forests especially on the eastern side. Nearly 43 per cent of the area of the State is forest and its timber is even exported to foreign parts. The Forest Department is a source of income to the State.

[482] Coolies carry faggots of fuel on their heads from the neigh-
[435] bouring hills for sale; sometimes the people get cart-loads; a decent head-load now costs nearly 4 annas and a cart-load from Rs. 2-8-0 to Rs. 3; prices were much lower a few years back. A full head-load is divided into smaller bundles before being sold, and a woman may get six or eight annas for a bundle as heavy as she can carry.

Durable building materials are got from the forests and timber depots, but mango-planks, bamboos and jack-tree planks are also used.

342 *Houses.*—Houses are not built in rows. Every house is surrounded by a compound hedged round by bamboo. Such compounds are intersected by lanes. Rice-straw is used in thatching houses; tiles are replacing thatch but the majority of houses still are thatched. No terraced houses can be seen in these parts where the monsoon rains pour down with full force.